

**WHAT IS CLAIMED IS:**

1. An image display system, comprising:
  - a) an image projector including a mirror optical element for forming an exit pupil for viewing an image at a viewing location;
  - b) a viewer eye position detector for generating a signal representing the position of a viewer's eyes relative to the location; and
  - c) a control system responsive to the signal for providing relative motion between the viewer and the image projector to maintain the viewer's eyes at the exit pupil.
2. The image display system, claimed in claim 1, wherein the image display system further includes an adjustable rest for positioning a viewer relative to the image projector and the control system adjusts the position of the adjustable rest.
3. The image display system claimed in claim 1, wherein the control system adjusts the position of the image projector.
4. The system claimed in claim 1, wherein the image projector is adjustable to move the predetermined image location and wherein the control system adjusts the image projector in coordination with the adjustable rest to locate the viewer's eye at the exit pupil.
5. The system claimed in claim 4, wherein the image projector is adjustable to move the predetermined image location in a horizontal and a vertical direction.
6. The system claimed in claim 2, wherein the adjustable rest translates in horizontal and vertical directions, and rotates about the horizontal and vertical axes.

7. The system claimed in claim 2, wherein the adjustable rest moves with six degrees of freedom.

8. The system claimed in claim 1, wherein the viewer eye position detector includes a light source for emitting non-visible radiation and one or more cameras.

9. The system claimed in claim 8, wherein the light source emits infrared radiation.

10. The system claimed in claim 2, wherein the adjustable rest is adjustable to compensate for the height of a viewer.

11. The system claimed in claim 1, wherein the projected image is auto-stereoscopic.

12. The system claimed in claim 3, wherein the image projector includes means for adjusting the location of the exit pupil.

13. The system claimed in claim 2, wherein the adjustable rest is a chair.

14. The system claimed in claim 13, wherein the adjustable rest includes a servo-mechanism.

15. The system claimed in claim 13, wherein the adjustable rest further includes a viewer restraint.

16. The system claimed in claim 1, further comprising a motion platform including a viewer station and on which the image projector is mounted for imparting a sense of motion to the viewer.

17. The system claimed in claim 1, further comprising a sound system capable of creating a perceptual location of a source of sound and wherein the control system adjusts the perceptual location of sound from the sound system in response to viewer movements.

18. The system claimed in claim 2, wherein the adjustable rest further includes means for locating the rest for convenient entry prior to positioning the viewer and for convenient egress following viewing.

19. The system claimed in claim 2, wherein the adjustable rest includes a head-rest for positioning the viewer's head.

20. The system claimed in claim 2, wherein the adjustable rest includes a manual control for allowing the viewer to override the control system.

21. The system claimed in claim 1, wherein the eye position detector includes means for detecting viewer movement towards and away from the projector.

22. The system claimed in claim 21, wherein the means for detecting viewer movement employs triangulation.

23. The system claimed in claim 1, wherein the viewer eye position detector employs one or more cameras.

24. The system claimed in claim 23, wherein the one or more cameras are placed in front of the viewer.

25. The system claimed in claim 23, wherein the one or more cameras are located beside, or in front of the viewer.

26. The image display system claimed in claim 3, wherein the image projector is adjustable to move the image projector in a horizontal or vertical direction.

27. The image display system claimed in claim 3, wherein the image display system includes an adjustable frame for mounting the image projector.

28. The image display system claimed in claim 27, wherein the adjustable frame is moveable in a horizontal or vertical direction.

29. The image display system claimed in claim 27, wherein the adjustable frame is rotatable about one or more axes.

30. The image display system claimed in claim 1, wherein the control system accommodates for a viewer's height.

31. The image display system claimed in claim 23 wherein the one or more cameras are mounted on the image projector.

32. The image display system claimed in claim 3 wherein the control system adjusts the position of the mirror optical element.

33. The image display system claimed in claim 32 wherein the image projector contains a multiplicity of optical elements and light valves and the control system adjusts both the position of the optical elements and the light valves and the position of the mirror optical element independently.